



## COVID-19 and the second wave during autumn: preventive strategies in cardiac and thoracic surgery divisions

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Dear Editor,

During the current second peak of the COVID-19 (coronavirus disease 2019) pandemic seen worldwide, increasing critical care unit bed capacity, associated with an increase in both ECMO (extracorporeal membrane oxygenation) and mechanical ventilation devices, is crucial for maintaining an adequate setting for cardiothoracic surgery in referral centers [1]. Theoretically, this urgency will persist until herd immunity is acquired either by natural infection or through vaccination, which has a low probability of being available on a global scale by the 2020 fall and winter seasons. Results of three early-phase COVID-19 vaccine trials were reported, one from the mRNA-1273 Study Group, the second from the Jenner Institute at Oxford University with support from AstraZeneca, and the third from CanSino Biologics in Wuhan, China [2–4]. These ongoing clinical trials have reported promising data by inducing an anti-SARS-CoV-2 (severe acute respiratory syndrome coronavirus 2) humoral response.

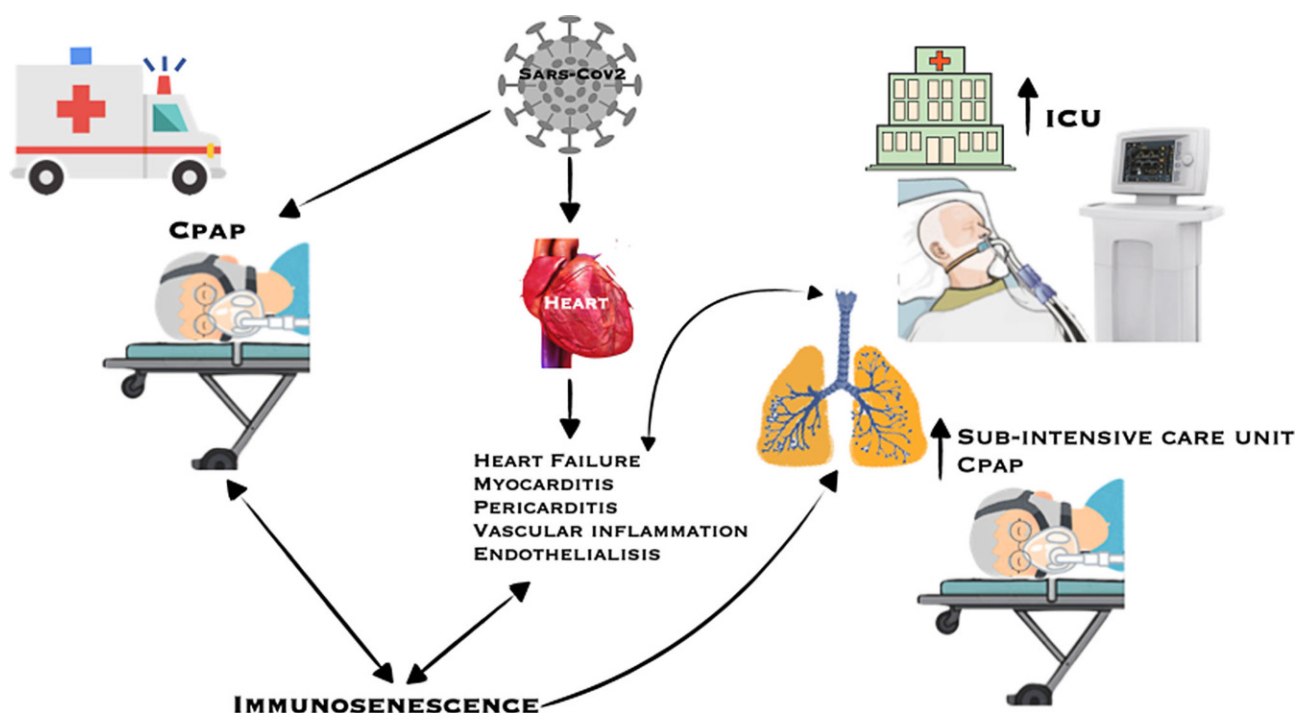
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However, additional mitigation methods are needed. Additionally, cocirculation of COVID-19 and the seasonal influenza virus has been established [5]; thus, we are observing the condition that influenza *per se* exerts pressure on health care systems through increasing hospital admissions to critical units, accounting for increasing mortality worldwide. Recently, it was established that viral respiratory infections may act through synergic epigenetic mechanisms in the development of severe forms of respiratory infections [6]. Moreover, gram-positive pathogens, *Staphylococcus aureus*, group A *Streptococcus*, and *Streptococcus pneumoniae* have been shown to co-isolate with COVID-19 [7]. Therefore, it was proposed that pneumococcal vaccination could prevent superimposed *S. pneumoniae* infection in patients with COVID-19. As the infection rate for COVID-19 has been surprisingly high worldwide since mid-September 2020, it is mandatory to follow tight infection control measures including applying bundles in ventilator-associated pneumonia and central line-associated bloodstream infections [8, 9]. This to assure both the ordinary and urgent waiting lists for cardiac and thoracic surgery patients. Infection prevention and antibiotic stewardship would limit the spread of multidrug-resistant (MDR) organisms [10]. It is noteworthy that also MDR organisms may exert their detrimental action through epigenetic mechanisms [11]. Thus, one of the novel challenges is to control such epigenetic mechanisms in addition to current validated therapies against COVID-19 [6].

The second wave is the time when the implementation of infection control is required in the preparation of surgical interventions, also in patients with a previous history of COVID-19 [12]. We need to depict a new scenario for these frailty patients in “phase 3” of the pandemic [1, 12]. This clinical setting needs to pay particular attention to cardiovascular involvement



**Fig. 1** Clinical scenario in which elderly subjects have more possibilities to require intensive care unit (ICU) assistance. This is partially due to immunosenescence and car-

diac susceptibility to COVID-19 (Corona Virus disease 2019). CPAP continuous positive airway pressure

and immunosenescence in elderly patients [13–15], who have more possibilities to require ventilatory support when hospitalization is required for COVID-19 (Fig. 1). Thus, the second wave that we are suffering needs to be addressed by a multidisciplinary team supporting cardiac and thoracic surgery units that include experts in vaccines, geriatrics, pneumology, and virology as well as dedicated rehabilitation programs for these frailty patients after surgery.

**Conflict of interest** F. Donatelli, A. Miceli, S. Cirri, E. Coscioni, and C. Napoli declare that they have no competing interests.

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